

Benefit incidence analysis of health care services provision in Cameroon

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Abstract – Equity in access to healthcare services is both an important goal and a key prerequisite for achieving universal health coverage. This study analyzes the incidence of healthcare service provision in Cameroon. It draws on data from the most recent Cameroonian household survey (ECAM 4) and public health expenditure data from the Ministry of Health (MoH). The benefits derived from the use of the three formal healthcare service providers (public, private, and NGO) are considered. The decomposition of a concentration index of healthcare service provision makes it possible to quantify the relative contributions of different healthcare providers across socio-economic groups, taking their needs into account. Public healthcare providers were found to be the most pro-poor, with a concentration index of -0.224. NGOs also favored the poor, as indicated by a concentration index of -0.17. Private providers were less pro-poor, with a concentration index of -0.15. The use of healthcare services by the poorest depends both on their health status (age, sex, illnesses) – except for the 30–59 age group and hypertension cases – and on other factors such as education level, marital status, or rural residence. Our analysis reveals that the utilization rate of public healthcare services remains low compared to that of private providers. Therefore, it is recommended that authorities invest more in public health facilities and in the quality of their services to increase the use of public healthcare by the poorest.

Classification JEL

I11, I12, I13, O55

Key words

Concentration index of health care subsidies
Healthcare providers
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INTRODUCTION

Equity in the access and use of healthcare services or facilities is an important goal to be achieved by any health system. It is equally a prerequisite for implementing Universal Health Coverage (UHC) in any country. However, in many low- and middle-income countries, the poor and underprivileged persons, despite having relatively greater health needs, make less use of medical services than people with higher incomes; this leads to inequality in the access to healthcare services (Akazili et al., 2012; Mtei et al., 2012).

The demand and supply of healthcare services could contribute to equity in the distribution of healthcare benefits. In low-income countries and middle-income countries, healthcare is generally provided jointly by the public and private sectors, including non-governmental organizations (NGOs). In Cameroon, for instance, healthcare services are provided by the public and private sectors, as well as NGOs (Ministry of Health [MoH], 2012). Benefiting from the healthcare services provided by public health units in the country requires the payment of a small fee; meanwhile, those provided by the private health units are relatively more expensive, and thus inaccessible to people with low incomes. An increase in the provision of healthcare services by the public and private sectors creates an environment that facilitates access to the former. This makes access to healthcare units more equitable.

From the demand-side, the behavior of individuals seeking healthcare services varies according to social group. This is partly linked to the population's perceptions of the importance of health, health infrastructure, and limited incomes, among other factors (Gwatkin et al., 2005; Muriithi, 2013).

Cameroon has significant economic disparities, with 37.5% of its 20 million citizens living below the poverty threshold (National Institute of Statistics [NIS], 2014). Furthermore, 82.48% of the population relies on the informal sector which provides only unstable incomes, while only 17.52% of the total population is employed in the formal sector (NIS, 2014). Given the supply and demand conditions for healthcare services in Cameroon, there is strong reason to believe that inequity in access to these services could be considerable.

In order to achieve universal health coverage UHC, everyone should have equitable access to healthcare services free from any economic or financial barriers. One measure of progress towards achieving UHC is the degree of inequality in health benefits across various socioeconomic groups. Since the poorest members of society generally require medical services more frequently, the distribution of benefits should consider this population group. Therefore, the extent of progress towards UHC is reflected, not only in the relative distribution of the benefits but also in the actual benefit accumulated in relation to the absolute need for healthcare services in all socioeconomic groups. This study aims to examine to what extent the benefits coming from health services in monetary terms are distributed across the various socioeconomic groups, and how the benefits coming from all the providers of healthcare services contribute to the equity of the health system in Cameroon. This would enable the formulation of public policy recommendations to the government and the design of programs that would enable the putting in place of a UHC.

While equity is widely referred to in global and country-specific UHC policy documents, its multiple dimensions result in a rather rhetorical utilization of the concept. Whereas equity covers various levels and types, many global UHC documents fail to define it properly and to comprehend the breadth of the concept. Consequently, perhaps, country-specific policy documents also use equity as a rhetorical principle, without sufficient consideration for concrete ways for implementation (Paul et al., 2019).

The following paragraph provides a brief overview of Cameroon's health system offering insight into the distribution of healthcare benefits across socio-economic groups and its contribution to equity, and thus to the movement toward universal health coverage.

Cameroon's health system comprises public and private entities, institutions and organizations that provide health services to the population. The Ministry of Public Health (MoH) is responsible for maintaining all public healthcare services in Cameroon. The public health sector is the main provider of healthcare in Cameroon. Private providers (both non-profit and for-profit), traditional medicine, and traditional Chinese medicine are also available in the country. Funding for healthcare comes mainly from the government, public enterprises, foreign aid donors, private enterprises, households, religious missions, and NGOs (MoH, Ministry of Health, 2012).

The public health sector in Cameroon aims to provide the population with affordable healthcare services and medications. The Cameroonian public health system is divided into three levels: central (strategic), intermediate (technical), and peripheral (operational). Health services in Cameroon are provided by hospitals and clinics. The country has 178 health districts and 162 district hospitals, of which only 154 are operational. Additionally, Cameroon has 2,043 public healthcare facilities, most of which are concentrated in urban areas (MoH, 2012).

Public health services mainly include curative, preventive, promotional, and rehabilitative services; whereas, the private health sector mainly provides curative services for profit. NGOs primarily offer preventive and basic health care to underserved populations. Despite its limited infrastructure, the private sector employs more healthcare providers than the public sector.

The progressive (or regressive) nature of public health expenditures has been examined. Using data from the latest household living conditions survey (2018-2019) in conjunction with administrative data on health expenditures for the same period (provided by the Ministry of Health of Senegal), Samba et al. (2024) analyze the impact of benefits. To achieve this, the study segments the population into poverty quintiles and estimates how each group uses and benefits from public health expenditure, according to the level of care and geographical location. Furthermore, the study conducts an analysis of marginal benefits to discern the impact of an increase in public healthcare spending on various socioeconomic groups. The results reveal a distribution of benefits favoring the wealthy in both primary healthcare and hospital care, observable at the national and regional levels. Ultimately, an increase in public health spending would not result in a distribution of benefits favorable to the poor.

In 2014, out-of-pocket payments for healthcare in Cameroon represented a significant portion of household's prepaid income. Despite the slight progressiveness of out-of-pocket payments for healthcare, there are also inequalities as few people change rank after payment. Furthermore, disparities among income groups imply that the burden of ill health and out-of-pocket payments is unequal. These disparities can be reduced by targeting low-income groups through increased government expenditure on healthcare and prioritizing expenditure in favor of the poor (Ntembe et al., 2021).

Public spending on health does not translate into significantly better services for the poor, as evidenced by hospital stays. Furthermore, national results mask significant disparities between Indian states (Bowser et al., 2019). An increase in public health spending would not result in benefits being distributed in a way that favors the poor. Therefore, populations must be targeted to achieve greater equity between regions and social groups (Samba et al., 2024).

Without fair subsidies, poor refugees cannot afford healthcare services. In order to address health inequalities, organizations must adapt their programs to address the social determinants of health through interventions in multiple sectors (Fares and Puig-Junoy, 2021).

The World Bank (2018) has analyzed public spending in Cameroon over the past decade, based on its effectiveness and alignment with the goals of Vision 2035. The analysis covers public investments, payroll, public enterprises, and social sectors such as health and education which account for 20.5% of the budget. Despite an increase in investments, their yield remains low. Therefore, budget planning, human resource management, and the performance of public enterprises must be improved, while social services must be strengthened to support inclusive growth and poverty reduction.

In Cameroon, patients must pay for all medical services provided by private medical facilities, and the cost of treatment can be much higher than for equivalent procedures obtained in the public sector. As a result, only those who can afford private healthcare services can access them.

Healthcare financing is strongly influenced by direct payments from households, which account for 70.42% of the country's total healthcare expenditures (MoH, 2012). In principle, public facilities are accessible to all citizens. However, public and private healthcare providers and NGOs observe different socioeconomic patterns in the use of healthcare, which may be related to the distribution of healthcare benefits across different socioeconomic groups.

Recently, data on the inequalities and inequities in the use and provision of health care, as well as the benefits of public expenditure, are lacking. In order to have efficient pro-poor public expenditure has been lacking in Cameroon. To ensure efficient pro-poor public expenditure, policies favoring the poor must be implemented. Moreover, decision-makers should have a better understanding of who benefits from public spending and how policies could be developed to reduce inequalities in the health system.

The methods are described in section 1. Section 2 presents the empirical results and discussion.

1. METHODS

1.1. Data sources

The data comes from Cameroon's fourth nationally representative household survey, ECAM 4 conducted by the National Institute of Statistics (NIS) in 2014. The ECAM 4 sample consists of 12,847 households drawn using a stratified two-stage random sampling design. The strata were obtained by combining the 12 survey regions with the place of residence (urban, semi-urban, and rural). A total of 32 survey strata were formed, including 12 urban (Yaoundé and Douala, as well as the urban strata of each of the ten regions of the country), 10 semi-urban and 10 rural with one stratum per region. At the first level, enumeration areas (EAs) are drawn independently in each stratum with a probability proportional to the number of households in each area. A total of 1,024 counting areas are drawn, including 639 in urban strata, 99 in semi-urban strata, and 286 in rural strata. In the second level, in each of the first level EAs, a sample of households is selected by an equal probability procedure from the lists of households established during enumeration. The number of households sampled by counting areas is ten in Douala and Yaoundé, 12 in the other urban strata, and 15 in the semi-urban and rural strata (NIS, 2014).

ECAM 4 dataset contains socio-demographic variables, household consumption expenditure, individual healthcare utilization and expenditures, and other key variables for this study. These data provide an opportunity to observe the distribution of health care service utilization across socioeconomic groups. To conduct the Benefit Incidence Analysis, we will use data from both the ECAM 4 survey and the NHA. Data on public healthcare spending are computed from the NHA. Information on the utilization of all types of health care and health facilities by the entire population comes from the ECAM 4 survey. We assume that the unit cost is the same for a given type of healthcare provider.

1.2. Definition of variables

Measurement of socioeconomic status

The relevance of different measures of socioeconomic status for analyzing health equity is a subject of debate (O'Donnell et al., 2008). However, in the context of a developing country, similar studies to our own research (Akazili et al., 2012; Ataguba and McIntyre, 2012) have used annual consumption expenditure per adult equivalent as a measure of socioeconomic status, which is also used in this study. An alternative commonly used measure of socioeconomic status is a composite socioeconomic index.

However, this index cannot be used to calculate progressivity indexes (O'Donnell et al., 2008). The equivalence scale used by the NIS of Cameroon to construct the adult-equivalent consumption expenditure, which is used in this study, is 1 for each adult and 0.5 for each child, whereas the Oxford scale assigns a coefficient of 1 to any adult aged 15 or over, and of 0.5 to children under 15. This study applies the Oxford scale.

Provider categories

In the ECAM 4 survey, one of the questions asked concerned the type of healthcare structure that was consulted. The response options were: a first class hospital, a regional hospital, a district hospital, a district medical centre, an integrated health centre/health centre, a pharmacy, a clinic/medical office, an

infirmary of the school, at the place of job; a homevisit by a doctor or personal health, a traditional practitioner, a GIC/NGO health centre, an informal vendor of modern drugs, advice by phone, or other (to be specified).

These thirteen categories of healthcare service provider were recorded. In this study, these providers are classified into three broader categories: i) public, ii) private, and iii) non-governmental organisations (NGOs). Services from health workers and medical doctors in public hospitals and clinics were considered to be provided by the public sector.

Healthcare from medical doctors, practising in private facilities (such as GP chambers, hospitals and clinics) was regarded as private provision. Finally, any services from medical staff (e.g. health workers or doctors) at NGOs health facilities were classified as NGO provision.

Healthcare utilization

Health care utilization data are available in the ECAM 4 survey at the individual level for the 30 days prior to the survey date. The survey recorded a maximum of two healthcare visits. The survey did not distinguish between outpatient and inpatient visits. For NGO providers, all services were assumed to be outpatient services.

Socioeconomic groups

In keeping with the generally accepted convention, households were ranked from the poorest to richest according to their consumption expenditure per adult equivalent. We have chosen an adjusted version of the Oxford scale assigning a coefficient of 1 to any adult aged 15 or over, and 0.5 to children under 15.

1.3. Data management and statistical analysis

In this study, the Benefits Incidence Analysis (BIA) with the concentration index (CI) will be used to measure equity.

1.3.1. The benefits incidence analysis

The BIA is primarily used to conceptualize and link public service expenditure with households that have utilized them. This technique has been used to estimate the healthcare benefits received by individuals through socioeconomic groups (McIntyre and Ataguba, 2011). Historically, the BIA method has been used to analyze the expenditures of the public health system, and their performances in terms of equity. In practice, it has been used to improve efficiency and equity, to correct market failures, and to increase social welfare (van De Walle and Nead cited in Milanovic, 1995). Very recently, however, the BIA has begun to be used to evaluate the global equity of health systems concerning both public and private providers (Ataguba and McIntyre, 2012).

The BIA approach, also known as the classical approach or non-behavioral approach, has paved the way for its use in two studies by the World Bank, conducted by Selowasky (1979) and Mermen (1979). Later on, this methodology was adopted by several authors to analyze the incidence of governmental expenditure (see, for example, Castro-Leal et al. (2000)). The advantages of the BIA include its ability to focus on important issues such as how public expenditure programs efficiently target the poor. It does this by focusing on the different rates at which goods and services are used.

We will follow of Demery's (2000) approach to carry out the benefits incidence analysis. This approach involves three main steps for calculating the incidence of benefits:

1) Obtain estimates of the unit cost or subsidy implied by the provision of a particular public service. Data for this step are usually obtained from public expenditure accounts. For example, data on the budget for the cost per patient of subsidies by levels of health establishment.

2) Imputing subsidies to individuals or households identified as users of the service using available information on access to the service by different income groups. For example, visits to health establishments reported by different households in consumption expenditure surveys ordered by income level, from poor to rich.

3) Aggregate the individuals or households into ordered groups based on income or other relevant criteria such as race or gender, in order to distribute the benefits among these groups and estimate the incidence of per capita subsidies received by each group.

These steps can be expressed as mathematical equations as follows.

The subsidy for a specific public service (k) received by an individual (i) is given by the following equation:

$$S_{ki} = q_{ki}C_{ki} - f_{ki} \quad (1)$$

where S_{ki} represents the subsidy received by individual i on service k , q_{ki} indicates the quantity of service k used by individual i , C_{ki} represents the unit cost of providing service k in the region where individual i resides; f_{ki} represents the amount paid by individual i for service k . The public spending benefit incidence of subvention across socio-economic groups is defined as follows:

$$S_j = \sum_{k=1}^K H_{kj} \frac{E_k}{H_k} = \sum_{k=1}^K \frac{H_{kj}}{H_k} E_k \quad (2)$$

where S_j is the benefit incidence from total health spending enjoyed by consumption expenditure group j , H_{kj} represents the number of visits to health installations at level k (representing hospitals/clinics, etc.) by group j , H_k is the total number of such visits (across all the groups), and E_k represents the public expenditures on health (with the other costs subtracted). Note that is the unitary financing subvention for consultations at this level; thus, the share of the total financing subvention for health that goes back to the group is given by:

$$S_j = \sum_{k=1}^K \frac{H_{kj}}{H_k} \left(\frac{E_k}{E} \right) = \sum_{k=1}^K b_{kj} \cdot e_j \quad (3)$$

Clearly, this part (and, in effect, global inequality in the incidence of benefits) is determined by two factors: the group's share of consultations at each level of the healthcare system and the share of each level of the healthcare in total health expenditures. The value reflects the household's healthcare decisions, while the household's health reflects the allocation of public expenditure.

In this study, Benefit Incidence Analysis uses the constant unit cost method to allocate public health expenditures to households. This method considers the sum

of individual fees and public subsidies to be constant; thus, any royalties paid for the use of public services reduce the amount of public subsidy received.

1.3.2. The concentration index and the concentration curve

The concentration index

Having estimated the total amount of the subsidies received by each individual in the sample, the next step is to examine how the subsidies are distributed across the various income quintiles. A concentration index (CI)¹ will be used to determine whether health care subsidies are pro-poor or pro-rich.

The CI quantifies the degree of economic-related inequality in the variable of interest. The CI is calculated as follows:

$$CI = \frac{2}{\mu} COV(S_i, W_i) \quad (4)$$

In Equation 4, S_i is the amount of the subsidy received by individual i and μ is its mean, while W_i is a measure of living standard; it can also be considered as the fractional rank of the i^{th} individual in economic status. The concentration index (CI) depends only on the relationship between the health subsidy and the rank of the living standards variable, not on the variation of the living standards variable itself.

A positive CI indicates a pro-rich distribution of subsidies; in other words, healthcare benefits favor the rich. A negative CI, on the other hand, reflects a pro-poor distribution; in other words, healthcare benefits favor the poor. The CI of subsidies could become more pro-poor due to either low utilization of public health facilities by the rich or a higher concentration of user fees among the rich.

The decomposition of the concentration index

Inequality can be further analyzed by decomposing the concentration index into its contributing factors. Decomposition methods allow researchers to quantify the contribution of each determinant to observed income-related inequality while controlling for the effects of other variables.

In this study, we will use the method proposed by Wagstaff et al. (1991) to analyze the socioeconomic inequality among healthcare providers. This method has advantages over linear and non-linear regression models as it enables the relative contribution of factors to inequality in a health variable to be estimated (e.g., the gap between the poor and rich). In a linear additive regression model, the total provider Y_i variable is presented in terms of the intercept α , the relative contribution of $\bar{X}_k$ factors, and residual error term ε_i as follows:

$$Y_i = \alpha + \sum_k \beta_k X_{ki} + \varepsilon_i \quad (5)$$

¹ Although there are several measures of inequality, as Wagstaff et al. (1991) suggest, any measure of inequality should meet three minimum requirements: (i) it should reflect the experiences of the entire population, rather than the extremes of social class; (ii) it should be sensitive to changes in the distribution of the population between socioeconomic groups; and (iii) it should present socioeconomic characteristics related to inequalities in health. The CI is one of the few measures that meet these criteria. Given that CI is useful for quantifying health inequities, and breaking down the contribution of various factors to them, we used CI to examine socioeconomic-related inequality in the distribution of healthcare providers across the population of Cameroon.

From Equation 5, the concentration index Y_i , C , can be written as follows:

$$C = \sum_k \left(\frac{\beta_k \bar{X}_k}{\mu} \right) C_k + \frac{GC_\varepsilon}{\mu} \quad (6)$$

Equation 6 shows that overall inequality among healthcare providers has two components: deterministic or “explained” and “unexplained”. In this equation, β_k denotes the regression coefficient of the provider variable on determinant k ; $\bar{X}_k$ is the mean of determinant k ; μ is the mean of all healthcare providers’ index; C_k is the concentration index for determinant k ; and GC_ε denotes the generalised concentration index for the error term.

A constant unit cost means that the cost of producing an additional unit of a good or service remains the same, regardless of the quantity produced. This implies that variable costs (such as raw materials and direct labor) increase proportionally to the quantity produced. Assuming constant unit costs simplifies calculations and analyses, allowing the focus to be placed on the relationships between key variables.

In Equation 6, the explained component is equal to a weighted sum of the concentration index of the regressors where the weights are the elasticities. However, the portion of income-related health inequality that is not explained by systematic variation in the explanatory variables across income or expenditure groups reflects inequality among all providers across socioeconomic groups that cannot be accounted for by the selected predictors (Hosseinpoor et al., 2006). The part of income-related health inequality that cannot be explained by systematic variation in explanatory variables across income groups.

The concentration curve

In addition to the CI, the concentration curve will be used to illustrate the share of subsidies received by cumulative proportions of individuals in the population across the income distribution. Davoodi et al. (2003) provide a theoretical framework for analyzing the incidence of the benefits from public expenditure and targeting by using the concentration curves.

As Milanovic (1995), Sahn and Younger (1999, 2000), Demery (2000) and Davoodi et al. (2003) have shown, if the concentration curve of benefits lies above the 45° line, the benefits provided by the public health sector are said to be pro-poor. Such a concentration curve is concave rather than convex. According to Davoodi et al. (2003), an implication of the concavity for the quintiles is that quintile Q1 exceeds quintile Q5 and that quintile Q1 receives more than 20% of the benefits. In other words, public expenditure disproportionately benefit the lowest quintile in both absolute terms and relative to their population share. Similarly, the benefits are said to be pro-rich when Q1 receives less than Q5 or when the benefits’ concentration curve lies below the 45° line.

The CI and the concentration curve are powerful tools for estimating the distribution of health sector subsidies. However, visual inspection of the concentration curve is insufficient to determine whether subsidies are pro-rich or pro-poor. A formal statistical dominance test is necessary to definitively conclude whether subsidies to the health sector benefit the poor more than the non-poor.

According to the dominance test of the concentration curve, the outpatient care concentration curve is statistically pro-poor if there is at least one quintile point at which the concentration curve for outpatient care lies significantly above the 45° line, and there is no quintile point at which the 45° line lies above the concentration curve.

This study uses the concentration curve dominance test. This test evaluates whether health sector subsidies reduce inequality by comparing the distribution of income with the distribution of subsidies. Benefit incidence analysis and the construction of concentration curves and indices were undertaken using both Stata and the Data Analysis Stata Package (DASP 2.3).

2. RESULTS AND DISCUSSION

2.1. Results

This section presents the results obtained using the various methodological tools described in the previous section. Table 1 reports the participation rates² and the share of each wealth quintile³ receiving public subsidies from public, private, and NGO providers, respectively.

Table 1. Benefit incidence analysis of public spending on health care services providers

Quintile	Public		Private		NGOs	
	Participation Rate	Share by Group	Participation Rate	Share by Group	Participation Rate	Share by Group
Quintile 1 (poorest)	8.146	0.369	9.867	0.480	6.071	0.268
Quintile 2	5.198	0.236	4.684	0.229	4.618	0.205
Quintile 3	3.986	0.181	2.915	0.142	4.379	0.193
Quintile 4	2.892	0.131	1.944	0.095	4.449	0.198
Quintile 5 (richest)	1.814	0.082	1.120	0.055	3.051	0.136
All	4.406	1.000	4.101	1.000	4.511	1.000

Note: The first column for each type of provider shows the participation rate, which reflects the utilization rate of each type of healthcare provider; it is the number of uses per person per year. The second column shows the percentage share of each income group in the total number of consultations recorded at each type of healthcare facility. These percentages add up to 100%. Source: Authors' calculations using DASP software.

The results show that the utilization of public healthcare providers remains low compared to private providers. Private services providers were used more frequently (9.86%) than public (8.14%) and NGO providers (1.4%) regardless of individual background characteristics. Despite the low utilization of public healthcare services, public health spending appeared to be pro-poor in 2014. In fact, approximately 36.9% of public health spending benefited the poorest households compared to only 8.2% for the richest. For private providers, around 48% of public

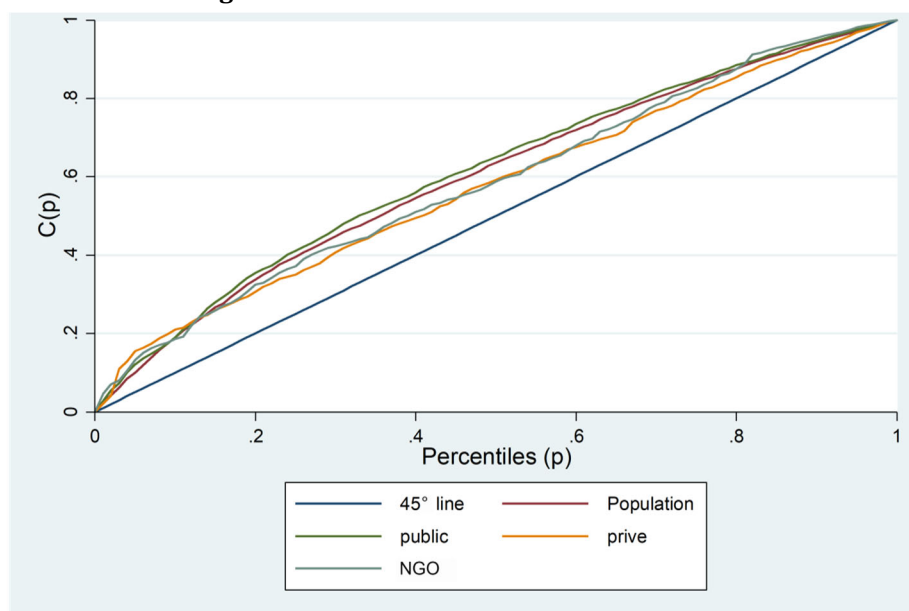
² The participation rate for each type of service is calculated by dividing the number of actual users by the number of eligible household members. The greater the participation rate, the greater the public service benefits received.

³ Presenting results to policymakers in the form of the share of benefits between quintiles is a useful way of expressing inequalities of benefits across socioeconomic groups in a simple and visually attractive manner (McIntyre and Ataguba, 2011).

health spending went to the poorest households compared to only 5.5% for the richest. In the case of NGO providers, approximately 26.8% of public health spending went to the poorest households while only 13.6% went to the richest. These results clearly indicate that poorer income groups benefited more from provider-based public health spending than richer income groups in 2014.

Figure 2 provides a comprehensive picture of the inclusiveness of public spending on healthcare providers. The concentration curves for spending on public, private and NGO providers lie above the 45-degree line, suggesting that spending is pro-poor. The population curve refers to total health expenditure across all providers, and this should be explicitly stated.

Figure 2: Concentration curves in Cameroon



Source: Authors' estimation using DASP software.

The concentration index of total healthcare benefits shows that these were pro-poor for all types of providers (see Table 2). Public providers appeared to be the most pro-poor with a concentration index of -0.224. NGO providers also favored the poorest people, as shown by their concentration index of -0.170. Private providers were comparatively less pro-poor with a concentration index of -0.151. These results suggest that subsidies associated with all provider types contributed to narrowing the income gap between rich and poor.

Table 2. Concentration index of healthcare benefits among different types of healthcare providers in Cameroon, 2014

Provider	CI	STD	(LB, UB)
Public	-0.224	0.015	(-0.256; -0.261)
Private	-0.151	0.050	(-0.251; -0.052)
NGOs	-0.170	0.034	(-0.237; -0.103)
All Providers	-0.201	0.008	(-0.218; -0.184)

Source: Authors' calculations using DASP software.

To draw definitive conclusions about whether healthcare provider subsidies in Cameroon are pro-poor or pro-rich, we need to examine both the concentration curves and the concentration index. Dominance tests will confirm whether the concentration curves dominate the 45-degree line or vice versa.

The results of the dominance tests (Table 3) show that, at the 5% significance level, healthcare provider subsidies are significantly pro-poor, thus rejecting the null hypothesis that the concentration curves are indistinguishable from the line of equality. This suggests that public healthcare provider subsidies are pro-poor.

Table 3. Dominance test of provider consultation incidence

	Providers		
	Public	Private	NGO
Against 45 Line	+	+	+

Note: Dominance test: + indicate concentration curve dominates the 45-degree line. Dominance is rejected if there is at least one significant difference in one direction and no significant difference in the other, with comparisons at 19 quintiles and 5% significant level. Source: Authors' calculations using DASP software.

The results of the decomposition are presented in Table 4. The first column lists the variables used in our analysis. We have grouped the predictors of healthcare utilization into three categories: need factors, non-need factors, and economic status. Need factors are biological determinants that are used as indirect indicators of healthcare needs and include age, sex, and morbidity (O'Donnell et al., 2008). Nine of the ten most commonly reported diseases/symptoms were included as morbidity variables: malaria, diarrhoeal disease, respiratory infection, arterial hypertension, hepatitis (A, B, C), diabetes, eye diseases, typhoid, and yellow fever. Non-need factors are predictors of socioeconomic healthcare utilization. These include a person's level of education (primary or lower vs secondary or higher) (O'Donnell et al., 2008) and marital status (never married, currently married, divorced/separated/widowed). Economic status was measured by household consumption expenditure per adult equivalent, following the widely accepted convention. This variable was converted into the log of equivalent consumption (Deaton and Zaidi, 2002). We also used adult equivalent consumption expenditure as a ranking variable for determining an individual's wealth status.

As shown in Table 4 (column 2), over 62% of the population is aged between 30 and 59, and the majority (71%) is male. Around 46.96% of the population resides in rural areas. Over the 30 days preceding the survey, 34% of adults reported malaria, 2.30% reported diarrheal disease, 8.85% reported respiratory infections, 8.44% reported high blood pressure, 0.18% reported hepatitis (a, b, c), 1.06% reported diabetes, 2.79% reported eye diseases, 4.29% reported typhoid, and 1.13% reported yellow fever. Educational attainment is generally, only 32% having completed primary or lower education and 36% had completed secondary education or higher. Just over 54% of individuals are currently married while 23% are divorced/separated/widowed.

Table 4 shows that several characteristics are significantly concentrated among the poor, as indicated by negative concentration indices (CIs): age 60 + (CI = -0.148), male (CI = -0.017), malaria (CI = -0.035), respiratory infection (CI = -0.082), hepatitis (a, b, c) (CI = -0.086), eye diseases (CI = -0.025), yellow fever (CI = -0.024), primary or lower education (CI = -0.114), currently married (CI = -0.063), and rural residence (CI = -0.280).

Table 4. Detailed contributions to inequality in probability of health care services utilization by need, non-need and consumption factors, Cameroon, 2014

	Mean of the variable (in %)	All providers			
		Concentration index (CI)	95% Confidence interval	Absolute Contributions to CI	Relative Contributions to CI
Concentration index for actual health care use (CI)		-0.201	(-0.218; -0.184)		
Residual				0.231	0.485
Need factors					
Age					
*Under 30 years					
30–59 years	62%	0.009	(0.000; 0.018)	0.0001	0.0003
60 and above		-0.148	(-0.175 ; -0.120)	-0.001	-0.003
Sex					
Male	71%	-0.017	(-0.024 ; -0.009)	-0.001	-0.003
*Female					
*Self-reported disease					
Malaria	34%	-0.035	(-0.065 ; -0.005)	-0.000	-0.000
Diarrhoeal disease	2.30%	0.008	(-0.128 ; 0.143)	-0.0006	-0.0008
Respiratory infection	8.85%	-0.082	(-0.178 ; 0.015)	-0.0005	-0.0004
Arterial hypertension	8.44%	0.189	(0.075 ; 0.305)	0.000	0.000
Hepatitis (a, b, c)	0.18%	-0.086	(-0.484 ; 0.313)	-0.000	-0.000
Diabetes	1.06%	0.1624	(-0.033 ; 0.358)	-0.000	-0.000
Eye diseases	2.79%	-0.025	(-0.153 ; 0.103)	-0.000	-0.000
Typhoid	4.29%	0.140	(0.035 ; 0.246)	-0.0005	-0.001
Yellow fever	1.13%	-0.024	(-0.26 ; 0.217)	-0.000	-0.000
Other illness					
Non-need factors					
*Education level					
Primary or lower	32%		(-0.129 ; -0.093)	-0.002	-0.003
Secondary or higher	36%	-0.111	(-0.129 ; -0.094)	-0.000	-0.001
Secondary or higher		0.186			
*Never-married					
Currently married	54%	-0.063	(-0.071 ; -0.055)	-0.006	-0.013
Divorced/ separated/ widowed	23%	0.053	(0.029 ; 0.078)	-0.0001	-0.0005
Rural	46.96%	-0.280	(-0.291 ; -0.269)	-0.008	-0.016
Household consumption (log of consumption per adult equivalent)					
		0.033	(0.032 ; 0.033)	-0.028	-0.059

Note: * Reference category: Under 30 years old, female, with another illness, not educated, never-married, living in an urban area.

Source: Authors calculations.

In contrast, the following characteristics are more prevalent among the wealthy: being aged between 30 and 59 years (CI = 0.009), diarrhoeal disease (CI = 0.007), high blood pressure (CI = 0.189), diabetes (CI = 0.162), typhoid (CI = 0.139), secondary or higher education (CI = 0.188), divorced /separated/widowed (CI = 0.053), and household consumption per adult equivalent (CI = 0.032434). Finally, the decomposition of the concentration index shows that except for hypertension and the 30-59 age group, all needs and non-needs factors contribute to the pro-poor nature of healthcare service utilization.

2.2. Discussion

The Benefit Incidence Analysis conducted in this study reveals that total public health spending on healthcare service providers in Cameroon was pro-poor in 2014, although the degree of inequality varied slightly depending on the type of provider. This study thus provides clear and consistent evidence of pro-poor government health subsidies across public, private and NGO providers with the poorest quintiles benefiting more than the richest.

More specifically, public spending on healthcare providers shows that public spending directed towards public providers was the most pro-poor, highlighting the government's commitment to ensuring affordable healthcare services for the most vulnerable. This may be attributed to health policy and strategy, the delivery system platform, and mechanisms of accountability on the demand side. However, for private providers, the distribution of public spending on healthcare was only marginally pro-poor. This less pronounced pro-poor distribution of private healthcare utilization may be explained by the fact that poorer individuals tend to rely more on lower-cost private outlets, such as chemists and pharmacies.

The findings of this study were very similar to those previous studies. Riboud (1990) examined 1986 data for Costa Rica and noted that health expenditure in that country was significantly pro-poor. Hanuner et al. (1992) examined Malaysian data and found that health expenditure favored the poor more in 1989 than in 1974. A report by Ensor et al. (2001) on Benefit Incidence Analysis, conducted in Bangladesh found that the benefits from public facilities were pro-poor. Limwattananon et al. (2012) conducted a benefit incidence analysis in Thailand and found that public subsidies for healthcare were pro-poor.

In another study, Burger et al. (2012) examined whether public health expenditure and access to health services in South Africa had become more or less pro-poor over time. They found that public health expenditure became more pro-poor between 1993 and 2008, with an increase in spending on public clinics and hospitals going to the poor. Furthermore, improvements in physical and financial access to public health services have benefited poor households, who use hospitals and public clinics more frequently than richer households. Onwujekwe et al. (2012) showed that, although coverage of priority public health services was below target levels in Nigeria, the poorest quintiles and poorest rural residents benefited most from net healthcare provision. Pro-rich bias in the distribution of government health spending has been observed in several countries (Castro-Leal et al., 2000; Mahal et al., 2001; Sahn and Younger, 2000).

In the case of African countries, government health spending favored the rich. For example, the poorest quintile in Ghana received 10%, 13%, and 11% of primary care facilities, outpatient hospital services, and inpatient hospital services,

respectively; while the richest quintile received 31%, 35%, and 32% (Limwattananon et al., 2012). Similar results were reported in Kenya, Tanzania, Madagascar, and Guinea (Castro-Leal et al. 2000).

Mtei et al. (2012) found that in Tanzania, total outpatient care benefits from the public sector were marginally concentrated among richer groups (CI = 0.010), whereas benefits from the private sector were highly concentrated in richer groups (CI = 0.370). Inpatient care benefits from public providers marginally favored richer groups (CI = 0.027), whereas benefits from private providers were largely concentrated among richer groups (CI = 0.680). In a study on South Africa, McIntyre and Ataguba (2011) found that outpatient care benefits in the public sector were concentrated among poorer populations (CI = -0.021), though inpatient care benefits were concentrated among richer groups (CI = 0.383). Inpatient care benefits from both public (CI = 0.112) and private (CI = 0.532) providers favored richer populations.

According to Limwattananon et al. (2012), in 11 Asian countries, excluding Hong Kong, Malaysia, Sri Lanka, and Thailand, the poor receive much less than their population share of public health subsidies. The pro-poor benefit incidence in some of these Asian countries is the result of limiting user fees, effectively protecting the poor from having to pay, and establishing a wide network of health facilities (O'Donnell et al., 2007), enabling the poor to access these services effectively.

On the other hand, the decomposition of need and non-need factors in this study consistently showed that need factors such as age, sex, and self-reported health status (except hypertension) were acting in a supportive direction to the poor. These results are similar to those of the van Doorslaer et al. (2004), Elwell-Sutton et al. (2013), and Bonfrer et al. (2014). The fact that the self-reported high blood pressure (hypertension), which is a need factor, largely contributes to the unequal distribution of healthcare use in favour of the wealthy, may be due to the fact that self-reported hypertension is concentrated among the richest individuals in Cameroon, although undiagnosed cases cannot be ruled out.

In this study, we used 'self-reported diseases and symptoms' as an indicator of healthcare needs. However, self-reported diseases may be an inaccurate measure of health needs when considering that poor people would do everything possible to avoid becoming ill due to the high cost of lost time or limited access to healthcare services, whereas high-income groups probably have relatively easy access to healthcare services and sick leave benefits in their formal sector jobs (McIntyre and Ataguba, 2011; Jahangir et al., 2017). However, our study is based on self-reported diseases. The healthcare needs for non-communicable diseases are best estimated by physical measurements and blood tests, which are not included in our database (ECAM 4). For this reason, some potential health needs may not have been considered in our study.

Among non-needs factors examined in our study, having received a primary or secondary education has a pro-poor effect on health care usage. This contradicts earlier studies' findings that higher education contributes to healthcare use among the wealthy. However, our results align with those of other low-income countries, including English-speaking African countries (Bonfrer et al., 2014). One possible explanation for this is that educated people are better able to identify and make use of affordable health services (Navaneetham and Dharmalingam, 2002). Our results

also showed that household consumption makes the greatest pro-poor contribution in health care utilization by far. These findings contrast with those of van Doorslaer et al. (2004), Lu et al. (2007), Leung et al. (2009), Elwell-Sutton et al. (2013), and Bonfrer et al. (2014), which suggest that household consumption has a far greater pro-rich impact on healthcare utilization.

On the other hand, our analysis revealed that poor people still do not use public health services much, despite free consultation services being provided in public institutions. This finding is consistent with that observed in Nepal (Saito et al., 2016) but contradicts the findings from Hong Kong, where public services are primarily utilized by the less affluent (Leung et al., 2009). Previous studies have shown that dissatisfaction with factors such as long waiting times, drug shortages, and inadequate medical equipment reduces utilization rates (Basu et al., 2012). Improving the management of public service providers could encourage poorer people to use public facilities.

This study aimed to conduct a benefit incidence analysis using the latest national-level data on healthcare utilization from the ECAM 4 survey, alongside NHA data on the health expenditure of various providers. While ECAM 4 and NHA provided an excellent opportunity to analyze healthcare benefits in Cameroon, there are some limitations worth mentioning. Unlike the South African study (McIntyre & Ataguba, 2012), the nature of the healthcare utilization data did not allow us to separately analyze the impact of ambulatory and hospital care benefits.

Moreover, while data on first-class hospitals, regional hospitals, district hospitals, and integrated medical centres exist in ECAM 4; details of their subsidies are lacking in NHA, precluding a detailed analysis of the impact of healthcare subsidies. Furthermore, the data used in this study covered healthcare utilization in the past 30 days with a maximum of two visits recorded during this period. This could have affected the estimation of inequalities in the Cameroonian healthcare system to some extent. On the other hand, the common BIA assumption used in this analysis is that the unit cost per healthcare provider service is the same across all income groups, which may not be accurate. A methodological limitation of BIA is that it does not provide specific reasons for incidence outcomes, particularly as they involve individual behaviour. However, understanding the specific causes would have provided important evidence to inform decision making and policy design.

Finally, the cross-sectional nature of the survey used in this study means it is not possible to infer causality or examine how equity-related public subsidies change over time. Further research using longitudinal data would enable the dynamics of the problem to be studied, helping to inform the design of more effective policies to address it.

CONCLUSION

The main objective of this study was to examine the extent to which health benefits are distributed by socioeconomic groups and the extent to which different types of providers contribute to inequity in health benefits in Cameroon. Benefits from the three formal types of healthcare providers (public, private, and NGOs) were analysed for the national population. Decomposition analysis was used to assess the extent to which each of the needs, non-needs, and consumption factors contributes to inequality in healthcare utilization. For this study, data were used from the latest

Cameroonian household survey (ECAM 4), which was conducted by the National Institute of Statistics of Cameroon in 2014, as well as data on public health spending from the Ministry of Health (National Health Account).

The results revealed a pro-poor distribution of healthcare benefits overall (CI = -0.201). The public providers appeared to be the most pro-poor, with a concentration index of -0.224. NGO providers also favored the poorest people as shown by the concentration index of -0.170. Private providers were found to be less pro-poor, with a concentration index of -0.151. Overall, public health spending on healthcare service providers in Cameroon benefits the poorest in society, demonstrating that public authorities have a pro-poor policy. Since most people in the poorest segments of society have access to health services in public healthcare facilities, it is logical that public spending on healthcare benefits the poor.

The use of healthcare services by the poorest depends both on their health status (age, sex, illnesses) – except for the 30–59 age group and hypertension cases – and on other factors such as education level, marital status, or rural residence. Despite the public sector providing free healthcare services, our analysis found that utilization rates remain low compared to those of private providers.

The study recommends the following policies to the Government of Cameroon to ensure resources are targeted more effectively.

As persons belonging to poor and disadvantaged economic groups have less access to healthcare services in public facilities, it is essential that funding and implementation authorities invest more in public facilities so that lower-income members of society benefit substantially.

Measures should be taken to improve the management of public healthcare service providers so as to increase utilization of public healthcare facilities amongst the poorest.

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Analyse de l'incidence des bénéfices des prestations de santé au Cameroun

Résumé - L'équité dans l'accès aux services de santé est un objectif important ainsi qu'une condition préalable essentielle à la réalisation de la couverture maladie universelle. Cette étude analyse en ce sens l'incidence de la prestation de services de soins de santé au Cameroun. L'étude s'est appuyée sur les données de la dernière enquête camerounaise sur les ménages (ECAM 4) et celles sur les dépenses publiques de santé du ministère de la Santé (MoH). Les avantages découlant de l'utilisation des trois prestataires formels de services de soins de santé (public, privé et ONG) sont pris en compte. La décomposition d'un indice de concentration des prestations de services de santé permet de quantifier les contributions relatives des différents prestataires de soins entre les groupes socio-économiques en tenant compte de leurs besoins. Les prestataires de soins de santé publics se sont révélés être les plus favorables aux pauvres, avec un indice de concentration de -0,224. Les ONG ont également favorisé les plus pauvres, comme le montre l'indice de concentration de -0,17. Les prestataires privés sont moins favorables aux pauvres avec un indice de concentration de -0,15. L'utilisation des services de santé par les plus pauvres dépend à la fois de leur état de santé (âge, sexe, maladies) – sauf dans la tranche d'âge 30-59 ans et pour les cas d'hypertension – et d'autres facteurs comme le niveau d'éducation, le statut marital ou la résidence en milieu rural... Notre analyse révèle que le taux d'utilisation des services liés aux prestataires de soins de santé publics reste faible par rapport à celui des prestataires privés. Par conséquent, il est recommandé que les autorités camerounaises puissent investir davantage dans les établissements de santé publique et la qualité de leurs prestations de services en vue d'augmenter le taux d'utilisation des services publics par les plus pauvres.

Mots-clés

Indice de concentration des prestations de services de santé
Prestataires de soins de santé
Équité en matière de prestations de santé
Méthode Benefit incidence analysis
Cameroun
